



Animal &
Plant Health
Agency

Year-end descriptive epidemiology report: Bovine TB in the Edge Area of England County: Hampshire Year-end report for: 2020

TB Edge Area - HAMPSHIRE



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Executive summary

Reporting area

Hampshire is part of the Edge Area that was established in 2013. In 2014, the bovine tuberculosis (TB) surveillance strategy for this area was incorporated into the UK government's strategy to achieve Officially Bovine Tuberculosis Free (OTF) status for England by 2038. This end of year report describes bovine TB in Hampshire.

Local cattle industry

There were minimal changes to the number, type and structure of cattle herds in Hampshire in 2020. The majority of herds are small, with 60% of herds having less than 50 cattle. There are no markets in Hampshire, and there is one medium-sized abattoir. There are grazing rights on common land in the New Forest.

New TB incidents

The total annual number of new TB incidents in Hampshire in 2020 (37) was almost unchanged from 2019 (40). The ratio of Officially Bovine Tuberculosis Free Status Withdrawn (OTF-W) to Officially Bovine Tuberculosis Free Status Suspended (OTF-S) incidents decreased from 45% (17 out of 38) in 2019 to 37% (14 out of 37) in 2020.

Risk pathways for TB infection

Movements of undetected infected cattle accounted for the single highest percentage of most likely attributable sources (36% of weighted source pathways) in Hampshire in 2020. The next most common source attribution was infected badgers (30% of weighted source pathways). The remaining risk pathways were assessed as residual infection, other wildlife sources, contiguous spread and unknown.

Details of the methodology used to calculate the weighted contribution of the different suspected sources of *M. bovis* infection for all new incidents, can be found in the main body of the report and in the [Explanatory Supplement](#) to the 2020 bovine TB epidemiology reports.

Disclosing tests

Over 50% of new TB incidents in Hampshire in 2020 were disclosed at Whole Herd Surveillance Testing. Radial testing accounted for 25% of disclosing tests, 50% of which were OTF-W. Incidents were also disclosed by six-month post-incident testing, and pre-movement testing.

Reactor numbers

The total number of cattle compulsorily slaughtered for TB control in Hampshire in 2020 was 276, of which 146 were skin test reactors and 130 were interferon gamma (IFN- γ) test-positives. This was a 29% increase from 2019, when a total of 197 cattle were removed, equating to an increase in the average number of reactors per incident from 4.9 (2019) to 7.5 (2020). There was no obvious reason for this increase.

Risks to the reporting area

Risks to Hampshire in 2020 continued to be movement of cattle with undetected infection from the High Risk Area (HRA) and Edge Area, and movements within the county from six-monthly testing parishes to annual testing parishes. Potential establishment of new endemic areas through cattle movements was illustrated by a cluster of *M. bovis* genotype 11:a incidents in west central Hampshire.

Risks posed by the reporting area

There is a risk of undetected spread of endemic infection towards the Low Risk Area (LRA) because the low cattle population density to the east of the county means there are less cattle to act as sentinels for wildlife infection. Movements of undetected infected cattle from the six-monthly testing areas of Hampshire and nearby areas within the north-west of the county pose a risk to other areas including the LRA.

Forward look

Herd incidence in Hampshire has levelled off, which gives some hope for the future course of the epidemic, but this is tempered by possible establishment of new areas of TB-infected wildlife. A substantial proportion, but not all of the county, has a crude herd OTF-W incidence of less than 2% (the target for the Edge Area by 2019) as TB infection is regionalised within the county.

Introduction

This report describes the level of bovine tuberculosis in cattle herds in Hampshire in 2020. Bovine tuberculosis is caused by the organism *Mycobacterium bovis* (*M. bovis*) and will subsequently be referred to as TB.

This report explores the frequency and geographical distribution of TB in cattle herds. It examines what is likely to be driving TB in this area, and the risks the disease in this county may pose to neighbouring cattle.

Although other sources may refer to TB 'breakdown(s)', this report will use the term 'incident(s)' throughout. This report is intended for individuals involved in the control of TB, both in the local area and nationally. This includes, but is not limited to: farmers, veterinarians, policy makers and the scientific community.

In 2014, the UK government published its Strategy to achieve Officially TB Free (OTF) status for England by 2038. A key action was to recognise the different levels of TB in different parts of the country and to vary the approach to control accordingly. To this end three management areas were established (see Appendix 1).

Hampshire forms part of the Edge Area. Control efforts are seeking to slow down and reverse geographic spread, and to reduce the incidence rate. The aim is to obtain OTF status for the Edge Area as soon as possible.

Changes to the Edge Area

On 1 January 2018 the Edge Area boundary was expanded westwards to absorb the former High Risk Area (HRA) parts of the five previously split counties. Cheshire, Derbyshire, Warwickshire, Oxfordshire, and East Sussex all moved fully into the Edge Area.

Furthermore, the routine TB testing frequency of herds in the counties in the west of the Edge Area adjoining the HRA (or parts thereof) was increased from annual to six-monthly. The respective descriptive TB epidemiology reports for those five counties of the Edge Area will focus on the whole county and key differences between the old and new parts will be highlighted where relevant.

The changes of January 2018 to the Edge Area boundary did not affect the county of Hampshire. However, at that time Defra introduced radial skin testing of herds located within a 3km radius of a new OTF-W incident to enhance the cattle TB surveillance regime in areas of the Edge Area that remained on annual testing, which includes parts of Hampshire. At the same time, herds in the north-west part of Hampshire moved to six-monthly surveillance testing.

Since May 2019, cattle herds in the six-monthly parts of the Edge Area that meet certain criteria are eligible to return to annual surveillance testing (earned recognition). These criteria are either:

- 1) the herd has been in existence for at least six years and has not had a TB incident in that six year period
or
- 2) the herd is registered to a bovine TB health scheme accredited under the Cattle Health Certification Standards (CHeCS) at level one or above

Changes due to COVID-19

During 2020, public health measures adopted by the government to contain the COVID-19 outbreak impacted the ability to carry out some TB testing due to social distancing and self-isolation guidelines, affecting both veterinarians and farmers.

In particular, from 23 March 2020, routine or targeted TB skin tests were not mandatory for cattle under 180 days old where, in the official veterinarian's judgement, the young stock could not be tested safely in line with social distancing guidelines. The temporary amendment allowing calves under 180 days old to be excluded from TB testing did not apply to short interval tests in TB incident herds (required to restore a herds OTF status) or pre- and post-movement testing.

Routine TB skin tests are required within a pre-defined window of time to maintain a herds OTF status. From 23 March 2020, for tests that were allocated until 30 June 2020, the Animal and Plant Health Agency (APHA) permitted an extension to the TB skin testing windows on a case by case basis, where testing had not been completed due to valid reasons associated with COVID-19. The testing window for short interval tests was also extended by up to 30 days, where tests were unable to be completed due to COVID-19.

Furthermore, on-farm epidemiological assessments carried out to establish the route of infection for a TB incident herd were carried out remotely, by telephone, for the majority of 2020.

Cattle industry

Herd types

There were a total of 703 cattle herds of determined size in Hampshire in 2020 which represents a small decrease from 2019 (743). This is part of an ongoing downward trend with a reduction of about 40 herds in the previous reporting year. The proportion of herds in each size bracket have remained virtually unchanged.

Around 60% of herds have less than 50 cattle (Figure 1) and these are mostly beef suckler herds or small beef fattening premises. Feeding and husbandry practices vary greatly within the county depending on herd type, herd size and soil type. Winter housing takes place on most premises from October to April.

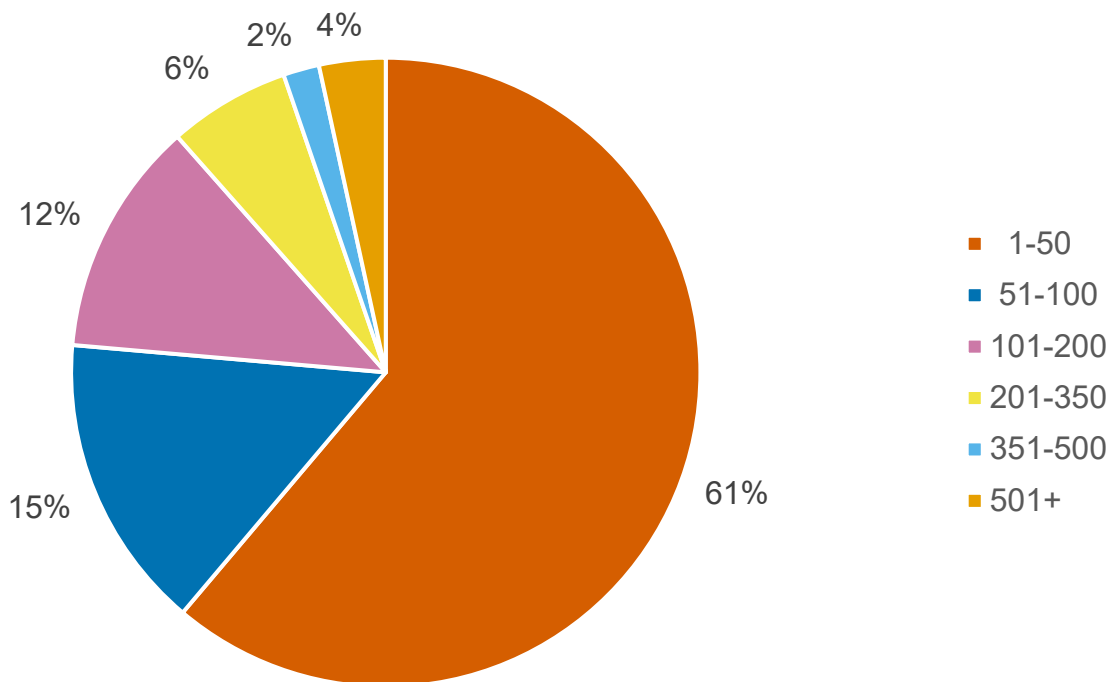


Figure 1: Proportion of cattle holdings in Hampshire, by herd size in 2020 (n=703). Note herds with an undetermined size are not shown.

Markets and abattoirs

There are no livestock markets in Hampshire, which means that to purchase or sell stock, farmers have to rely on markets in neighbouring counties or online auctions. The markets predominantly used are in the HRA. Therefore, there is a flow of cattle, especially for fattening, from the HRA into Hampshire.

There is one medium-sized abattoir in Hampshire at Farnborough.

There are a number of agricultural shows which have cattle classes including The New Forest and Hampshire Show, Alresford Agricultural Show and Romsey Show. None of these agricultural shows took place in 2020 due to COVID-19 public health restrictions.

Approved Finishing Units

There were no Approved Finishing Units in Hampshire in 2020. There is a single pre-movement testing Exempt Finishing Unit (EFU) in the north of the county which specialises in the collection of cull dairy cows for slaughter.

Common land

Summer grazing on temporary grazing land is not uncommon and some cattle are present on the common land of the New Forest all year round.

Descriptive epidemiology of TB

Temporal TB trends

Three analytical measures are used to describe the level of TB infection in these reports.

1. The number of new herd incidents that were disclosed in each year (Figure 2).
2. The annual herd incidence rate, reported as the number of new incidents per 100 herd-years at risk (100 HYR) (Figure 3). This is the number of new TB incidents detected in the year, divided by the time those herds were at risk of contracting TB. The 100 HYR incidence rate is used in this report as it accounts for different intervals between herd tests that other incidence measures do not (such as new TB incidents per number of herds or tests).
3. The annual end of year herd prevalence (Figure 4). This is the number of herds under restriction due to a TB incident, divided by the number of active herds at the same point in time. Prevalence provides a snap shot of the burden of TB on the local cattle industry.

All three measures include Officially Tuberculosis Free Status Withdrawn (OTF-W) incidents, and Officially Tuberculosis Free Status Suspended (OTF-S) incidents.

OTF-W incidents are those in which at least one animal was identified with typical lesions of TB at post-mortem (PM) inspection, and/or positive for *M. bovis* on culture from tissue samples.

OTF-S incidents are those with one or more reactors to the Single Intradermal Comparative Cervical Tuberculin (SICCT) skin test, but without full confirmation of *M. bovis* infection by PM inspection or bacterial culture.

TB incidents in non-grazing AFUs are not included in the prevalence and incidence calculations (excluding Figure 5) in this report due to the limited epidemiological impact of these cases.

Furthermore, herds restricted because of an overdue test rather than a TB incident are also excluded from calculations. Hence measures of incidence and prevalence in this report may be lower than those reported in the official TB statistics.

The total number of new incidents in Hampshire in 2020 (37) was marginally lower than in 2019 (40). This continued the decrease in new incidents seen from 2018 to 2019. The level of OTF-W incidents also dropped from 17 in 2019 to 14 in 2020 (Figure 2).

The annual herd incidence rate for all incidents (OTF-S and OTF-W) was 5.2 incidents per 100 herd-years at risk (HYR). The rising trend reported over the previous three years has reversed. (Figure 3).

The denominator for this incidence rate measure (herd-years at risk) is sensitive to changes in testing intervals within an area. This should be borne in mind when considering incidence

rate trends in some parts of the Edge Area that moved from annual to six-monthly testing in 2018.

A detailed description of the methodology used to calculate incidence per 100 HYR is available in the [Explanatory Supplement for 2020](#).

The annual incidence rate in Hampshire in 2020 (5.2) was slightly lower than that in 2019 (Figure 3). However, over the last five years, it has remained similar to the peak of 2016 when there was a dramatic rise from just 3.2 to 5.7.

Herd prevalence in 2020 (3.05%) resumed an upward trend after a dip in 2019. There continued to be a steady increase in end-of-year prevalence in Hampshire since 2010 (Figure 4).

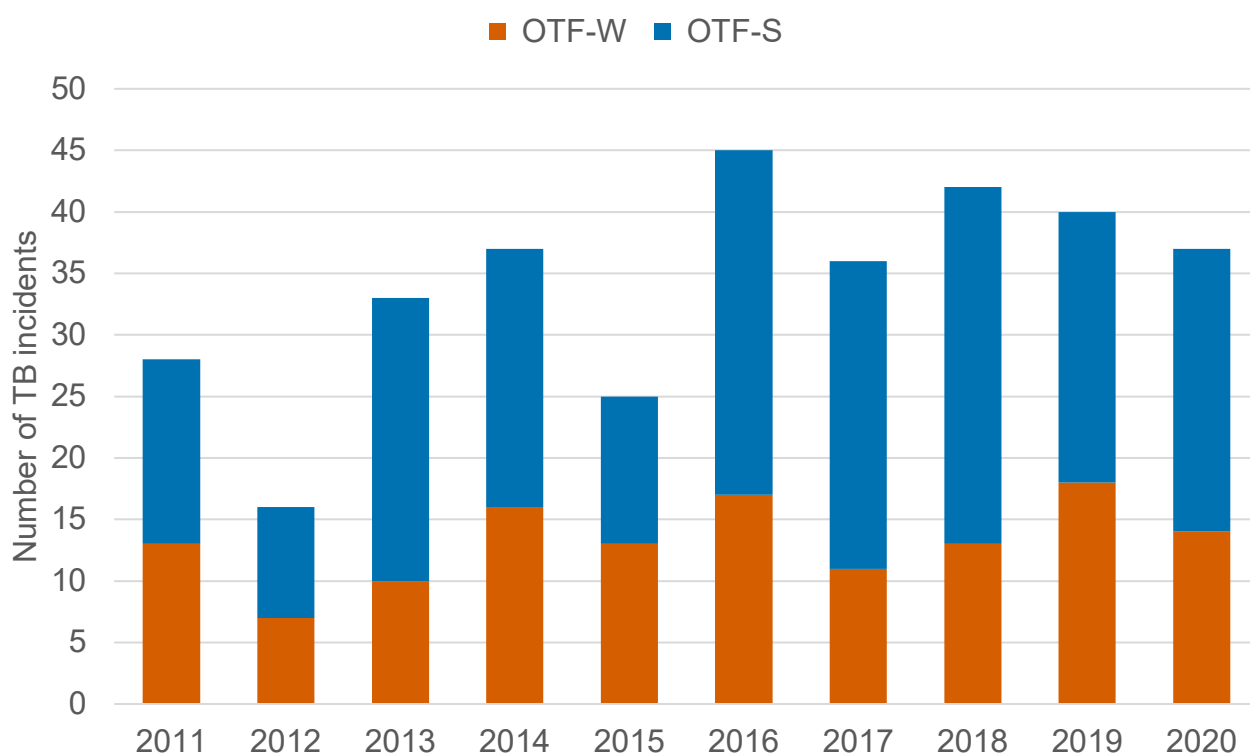


Figure 2: Annual number of new TB incidents in Hampshire, from 2011 to 2020.

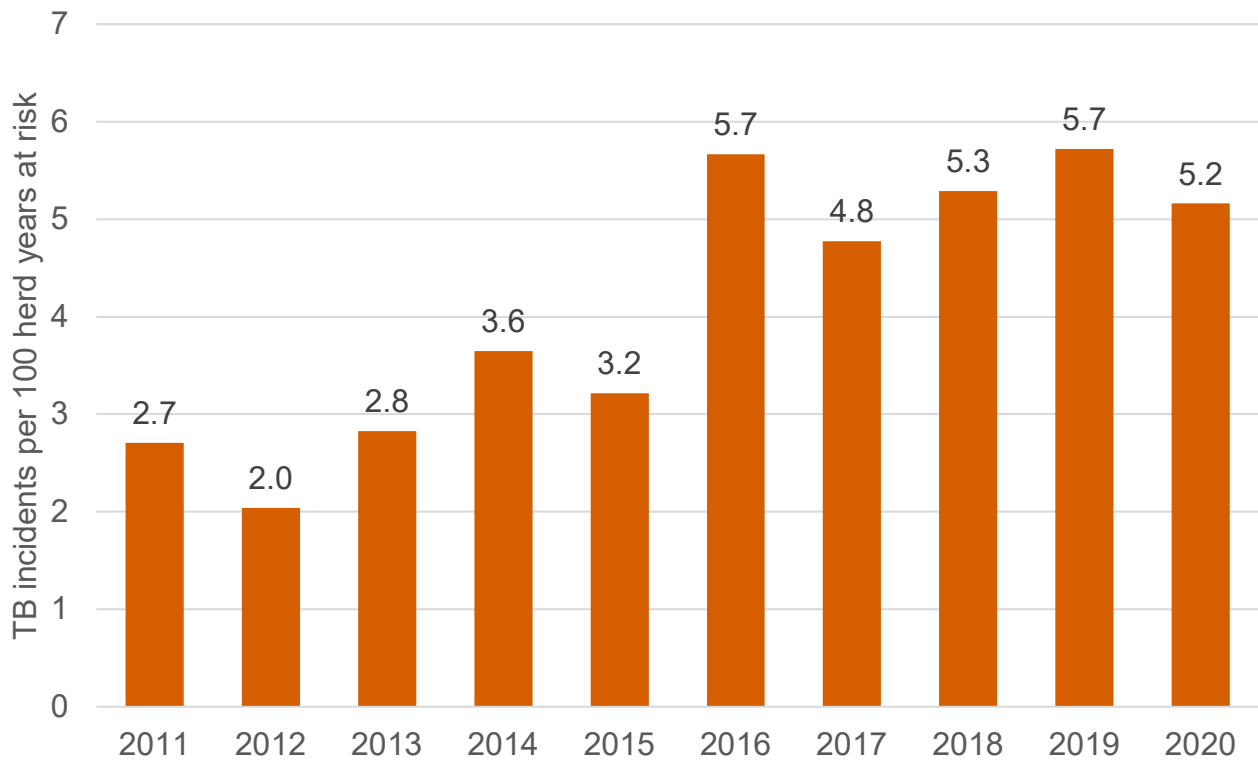


Figure 3: Annual incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S) in Hampshire, from 2011 to 2020.

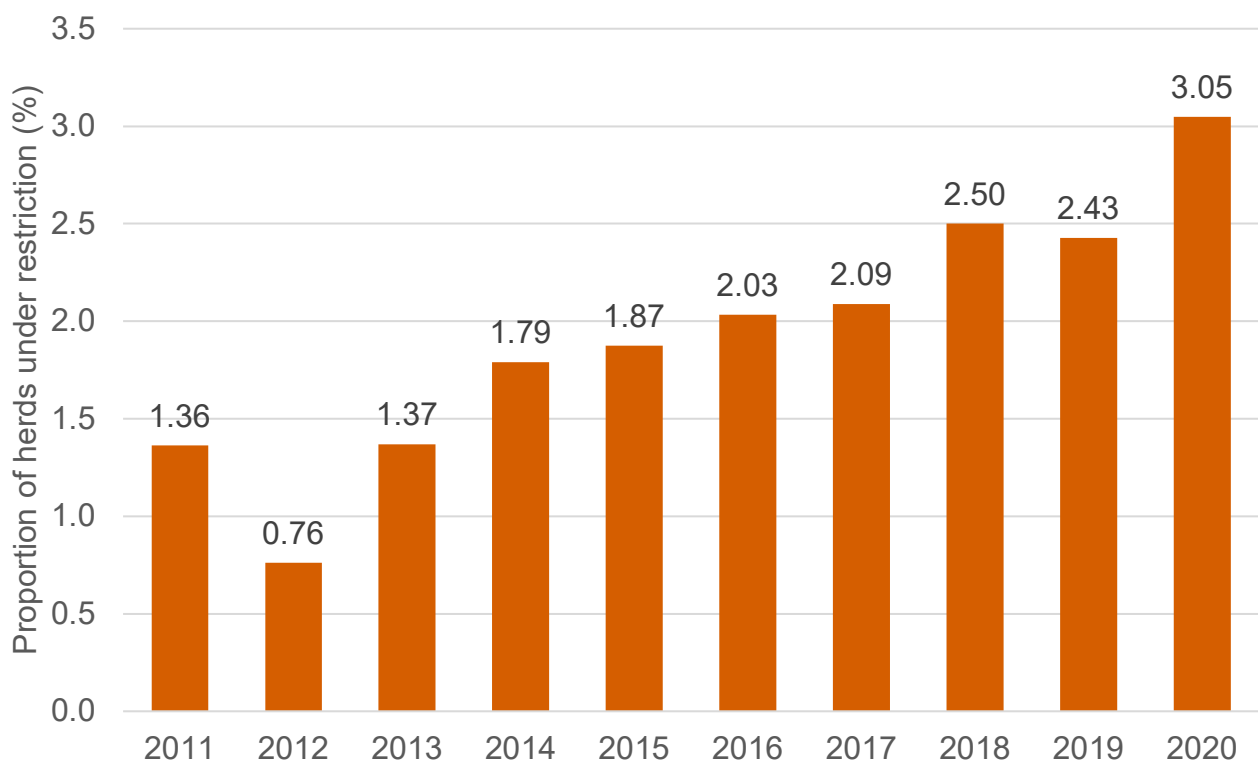


Figure 4: Annual end of year prevalence in Hampshire, from 2011 to 2020.

Progression towards achieving OTF status for Hampshire (crude incidence of indigenous OTF-W herd incidents less than 0.1%) was minimal in 2020. OTF-W crude incidence decreased from 1.9% in 2019 to 1.6% in 2020. Note that crude incidence is calculated as the number of new OTF-W incidents divided by the number of herds recorded at the end of the year.

OTF status in Hampshire (crude incidence of indigenous OTF-W herds incidents at 1.6%) is still a long way above the target of less than 0.1%

Geographical distribution of TB incidents

As shown in Figure 5, Hampshire's herd incidence (incidents per 100 herd-years at risk) at 5.2 is well below the average herd incidence level for all Edge Area counties (10.1) and is half that of neighbouring Edge Area county Berkshire (10.6). It is significantly lower than the herd incidence in the HRA counties of Wiltshire (18.8) and Dorset (13.6) which border Hampshire to the west.

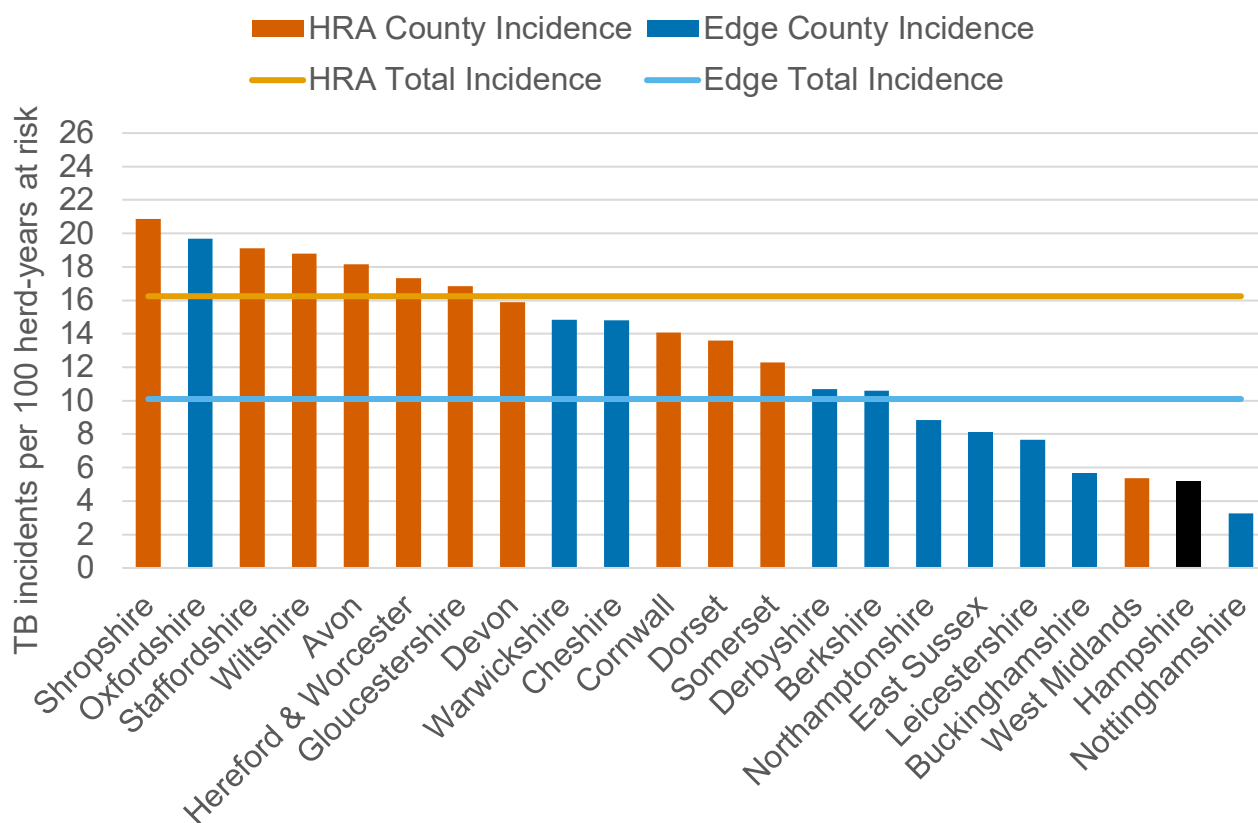


Figure 5: Incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S including finishing units) in 2020, by HRA and Edge Area county, highlighting the county of Hampshire.

Since 2019 the increase in TB incidents in the north-west quadrant of the county which were confirmed as *M. bovis* genotype 10:a has not continued in 2020. There were only two 10:a incidents in the county during 2020. These were in southern-central Hampshire and on the western border with Wiltshire (Figure 6).

The incident in southern-central Hampshire was likely introduced by movement of undetected infected cattle from northern Hampshire and the other incident either by cattle movements from the HRA or from residual infection.

TB incidents with *M. bovis* genotype 10:u continue to be centred around the north Hampshire and Berkshire border in the six-monthly testing area of the county. Two incidents were identified outside this group.

One to the east of the northern sector of the county with known epidemiological links to the main 10:u genotype homerange and one in central western Hampshire many miles from any other 10:u incidents where movement of undetected infected cattle was the most likely risk pathway.

The sole TB incident of *M. bovis* genotype 9:d (Figure 6) had a confirmed link via cattle purchased from Wiltshire. The concern with this incident was that it occurred in a herd which has grazing rights on the New Forest.

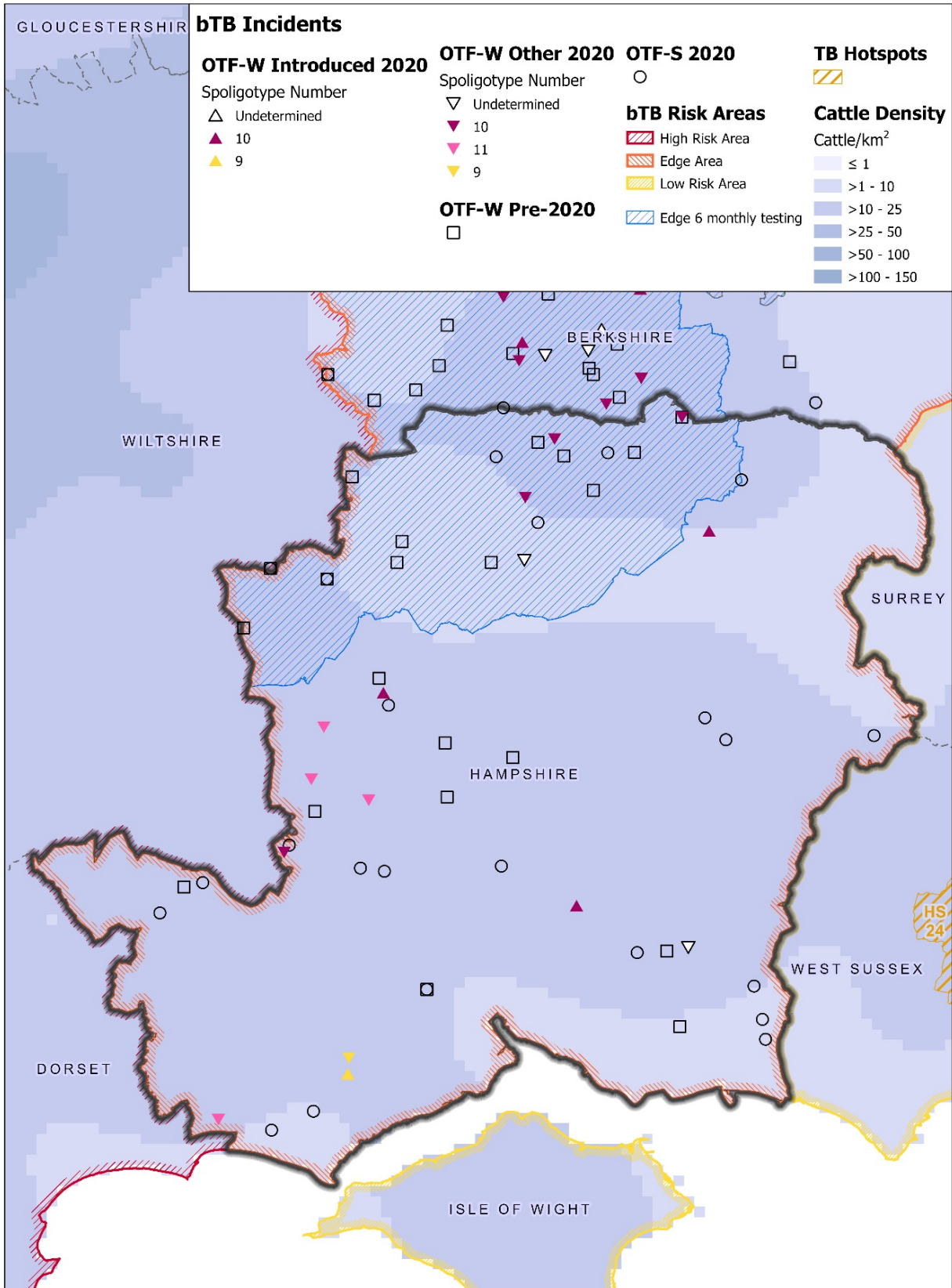
Fortunately, thus far no further incidents have been disclosed by 3km radial testing though a herd which co-grazed on the premises had a TB incident with genotype 9:d.

M. bovis genotype 11:a, which has been seen sporadically in Hampshire over the years, was confirmed in three incidents in 2020, and spoligotype 11 in a fourth. Three of these incidents were geographically close together in central western Hampshire, but with no opportunity for cattle-to-cattle contact to explain local spread.

Other possibilities include historic movements of cattle into the area. Genotype 11:a was associated with a purchased animal on a local farm in 2014, and more recent purchases into one of the three 2020 TB incident herds, which was traced back via a farm in Warwickshire to a herd in Devon where genotype 11:a is extensively found.

The fourth farm with spoligotype 11 in 2020 was a dairy in the south-west of the county close to the coast with no epidemiological links to the other three incidents. This farm had a previous incident in 2013 with genotype 11:a, so the 2020 incident could have been a recurrence from residual infection left in the herd.

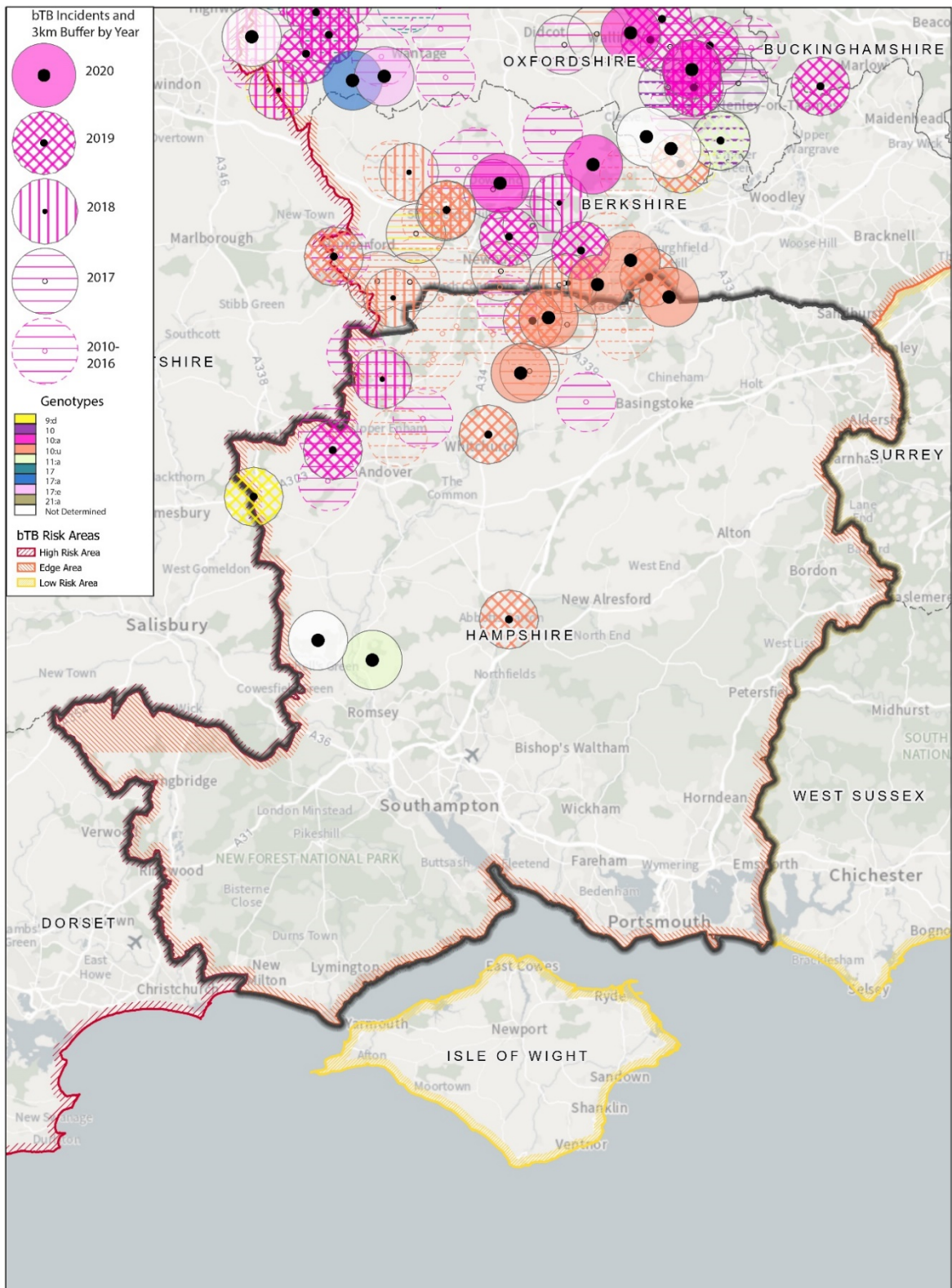
Figure 7 illustrates that genotype 10:u continues to circulate in the area around Kingsclere on the Hampshire Berkshire border. The concern over a reservoir of infection in wildlife developing in the area west of Winchester has abated, though there is now a suggestion that a group of TB incidents with genotype 11:a is developing in the Test Valley area of Hampshire.



Creator: GIS Team
 Source: Sam
 OTFW data as at 15th of April 2021
 Ref: 20210702
 Date: 02/07/2021

TB Cattle Density - Hampshire

0 4 8 16 Kilometers
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 Ordnance Survey 100051110



Creator: GIS Team
 Source: Sam
 OTRW data as at 15th of April 2021
 Ref: 20210723
 Date: 23/07/2021

Hampshire Endemic bTB Incidents

0 4.25 8.5 17 Kilometers

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 Ordnance Survey 100051110
 Animal & Plant Health Agency

Other characteristics of TB incidents

Incidents by herd type

There was a fairly even distribution of TB incidents between beef suckler, beef fattener and dairy herds in Hampshire in 2020 (Figure 8). It also follows that the largest herds (501+) were more likely to become OTF-W (four out of five).

However, of all larger herds (100+), OTF-W incidents now outnumber OTF-S by a small margin (13 out of 23). Small herds were overwhelmingly OTF-S incidents (ten out of twelve).

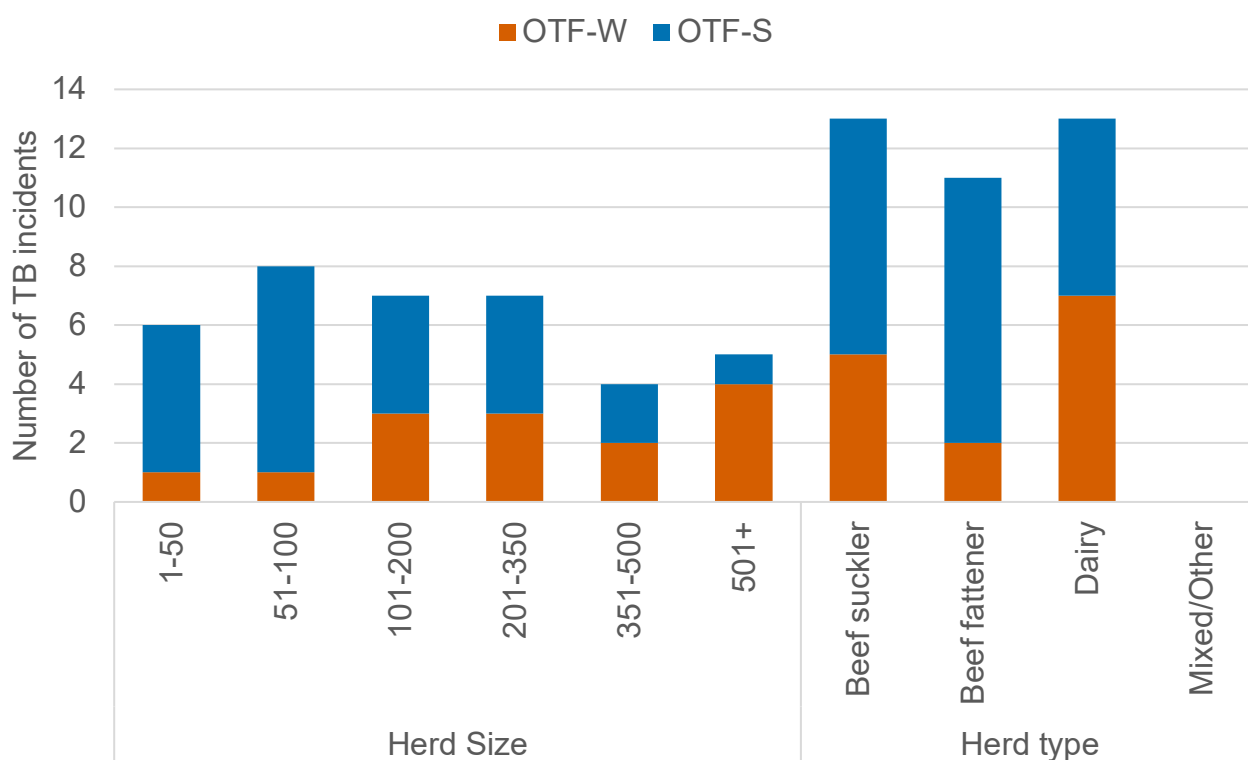


Figure 8: Number of TB incidents (OTF-W and OTF-S) in Hampshire in 2020, by cattle herd size and type.

Incidents by month of disclosure

As shown in Figure 9 and Figure 10, there was poor correlation from January to August 2020 between the number of skin tests being carried out in a certain month and TB incidents disclosed.

From September to December 2020, there was a stronger correlation. It is unusual to have had no TB incidents disclosed in January and February.

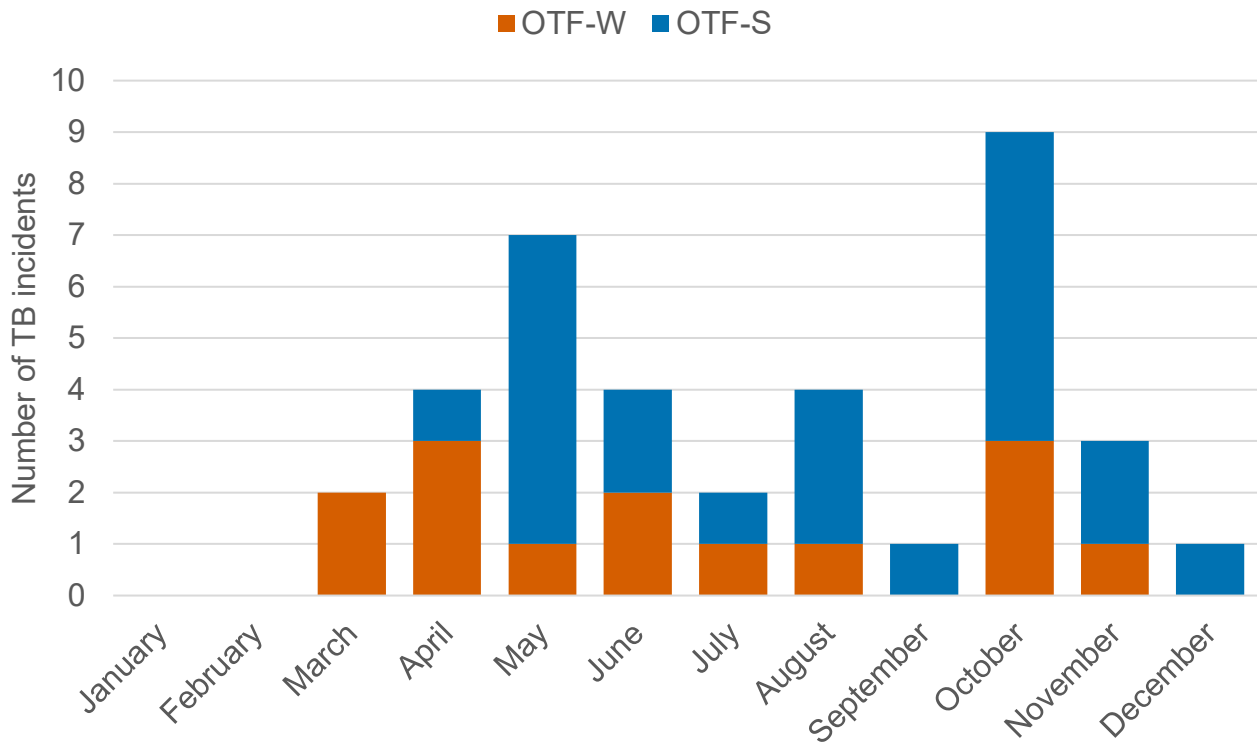


Figure 9: Number of TB incidents (OTF-W and OTF-S) in Hampshire in 2020, by month of disclosure.

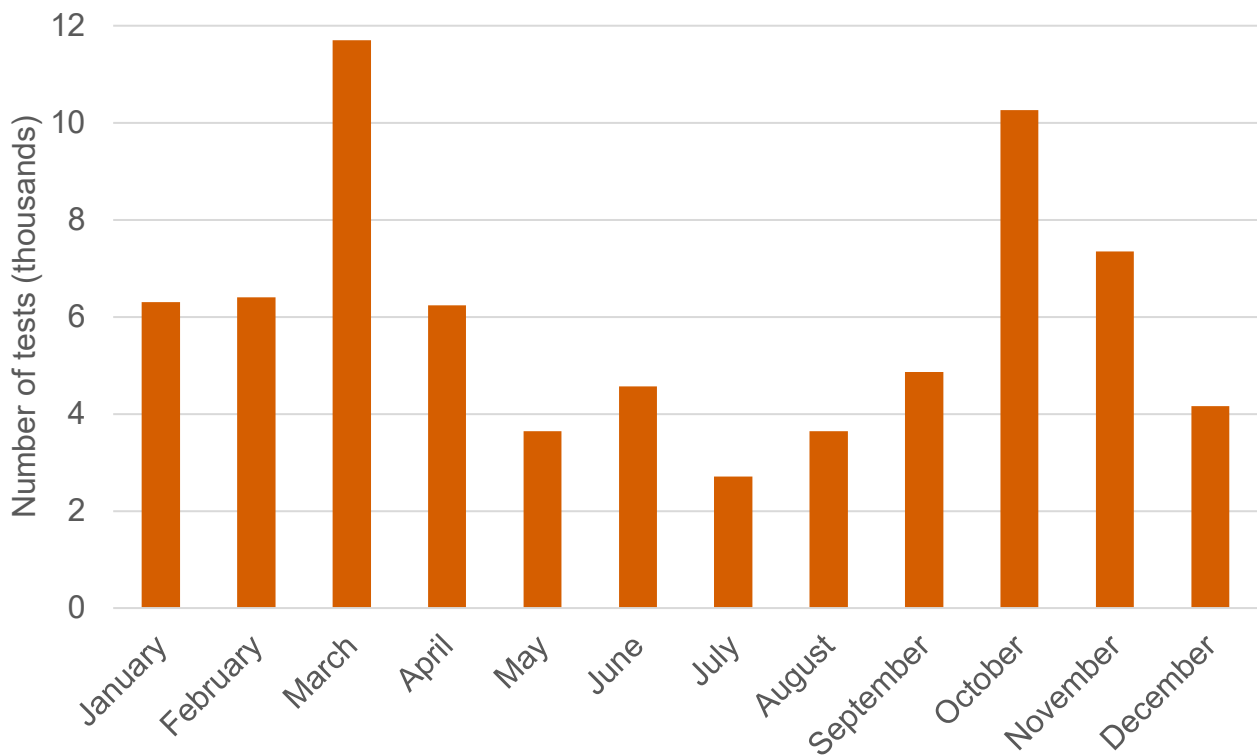


Figure 10: Number of tests undertaken in OTF herds in Hampshire in 2020, by month.

Duration of incidents

As can be seen in Figure 11, the majority of TB incidents (78%) which ended in 2020 resolved within the 101-150 days or 151-240 days categories. The herds in these categories were likely to have passed either the minimum of two, or three short interval tests before movement restrictions were lifted. This suggests that infection was cleared swiftly from over half the incidents in the county, even those which were OTF-W.

One OTF-W incident that is still unresolved has been under movement restrictions for longer than 551 days (persistently infected). This TB incident occurred in an organic dairy herd located on the border with Wiltshire. The incident commenced in February 2019 at a 6M post-incident test following a previous incident.

Only one animal was found to have typical lesions of TB at post-mortem inspection and was culture positive for *M. bovis*. A total of nine skin test reactors and 14 IFN- γ test-positives were detected during the entire incident at the time of writing this report.

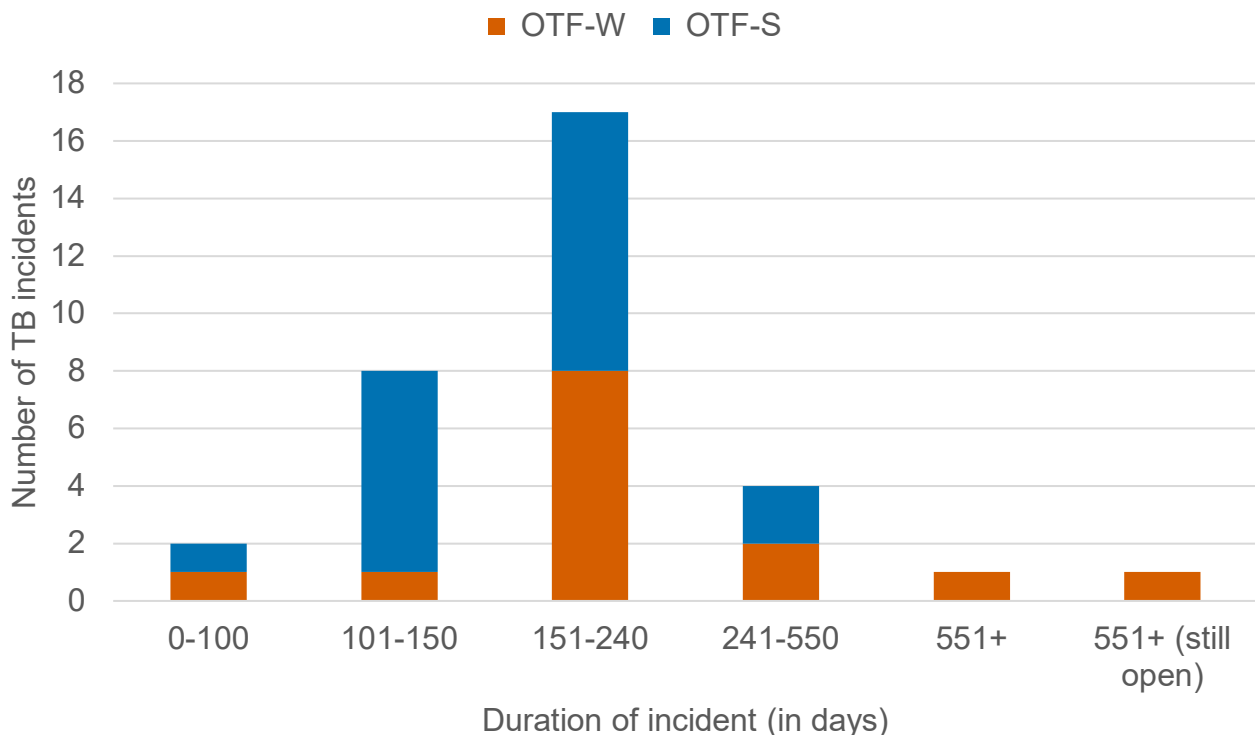


Figure 11: Duration of all TB incidents (OTF-W and OTF-S) that ended in 2020, and the number of persistent TB incidents (551+ days) that were unresolved at the end of 2020 in Hampshire. Note that Approved Finishing Units (AFUs) have been excluded.

Genotypes associated with TB incidents

Genotyping of *M. bovis* isolates has been used to trace the origin of TB infection. It is particularly useful in identifying where spread has occurred through cattle movements. Stable genotype clusters tend to be found in areas where there is a persistent local reservoir of infection.

APHA implemented whole genome sequencing (WGS) in place of genotyping from April 2021. During 2020 however, genotyping was still performed on *M. bovis* samples isolated from all OTF-W herds in the Edge Area.

M. bovis genotypes 10:a and 10:u remained the dominant genotypes in Hampshire in 2020 in areas where they have established homeranges. These two genotypes constituted 55% of the total number of *M. bovis* isolates identified in Hampshire in 2020 (Figure 12).

The 9:d isolates came from two neighbouring farms which shared grazing, and both purchased cattle from herds in Wiltshire within the homerange for 9:d. It is of concern that both these herds are graziers of the New Forest though fortunately 3km radial testing did not disclose further TB incidents in the locality.

Genotype 11:a has previously been isolated on rare occasions in Hampshire. It is of interest that there were three 11:a isolates in 2020, two of which are geographically linked to an 11:a isolation in 2014 and another spoligotype 11 in the locality.

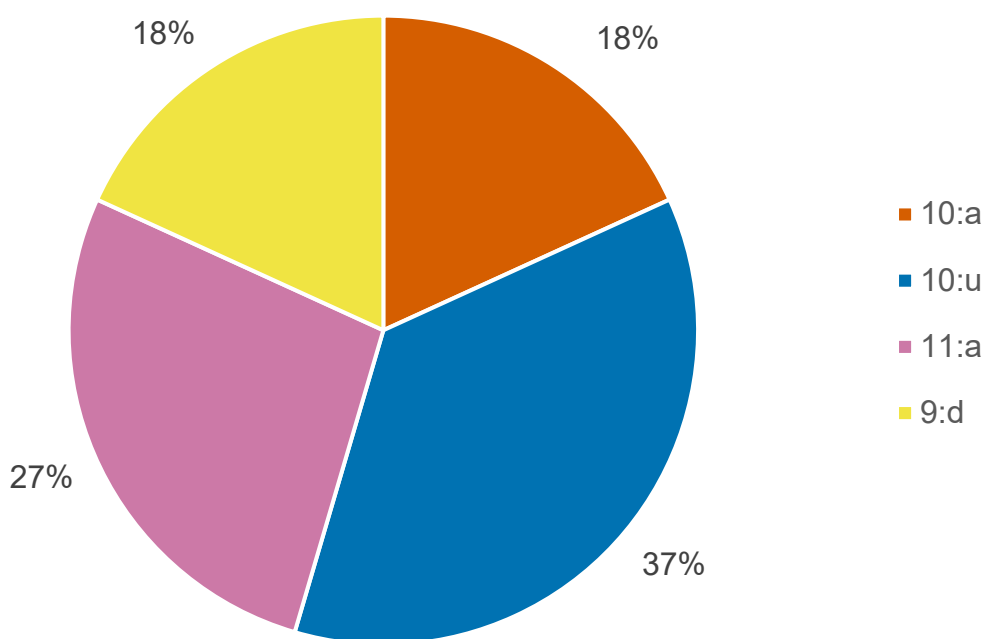


Figure 12: Genotypes of *M. bovis* identified in herds with OTF-W incidents in Hampshire that began in 2020 (n=12).

Unusual TB incidents

There were no unusual TB incidents in Hampshire in 2020.

Suspected sources, risk pathways and key drivers for TB infection

Key drivers of infection

The key drivers of the TB epidemic in Hampshire during 2020 were as follows:

- Purchase of undetected infected cattle from markets in the HRA continues to be an issue, despite pre-movement testing.
- Internal cattle movements within Hampshire from the six-monthly testing area to the annual testing area. There are situations where dairy heifers are reared in higher incidence areas of the county than the location of the home dairy. This was the presumed route of infection in one OTF-W incident in 2020.
- Likely endemic infection in wildlife in north-west Hampshire possibly leading to infection in cattle, including some cases of re-infection.

Sources of infection and risk pathways

It can be challenging to retrospectively establish the route of infection for a TB incident herd. APHA aims to complete an epidemiological assessment for all TB incidents in the Edge Area (both OTF-W and OTF-S).

This includes a thorough on-farm investigation and scrutiny of routinely collected data; such as cattle movement records, and the results of molecular analyses where available. This information is captured on the Disease Report Form (DRF).

During the assessment up to three risk pathways of infection are selected for each herd. Each risk pathway is given a score that reflects the likelihood of that pathway bringing TB into the herd.

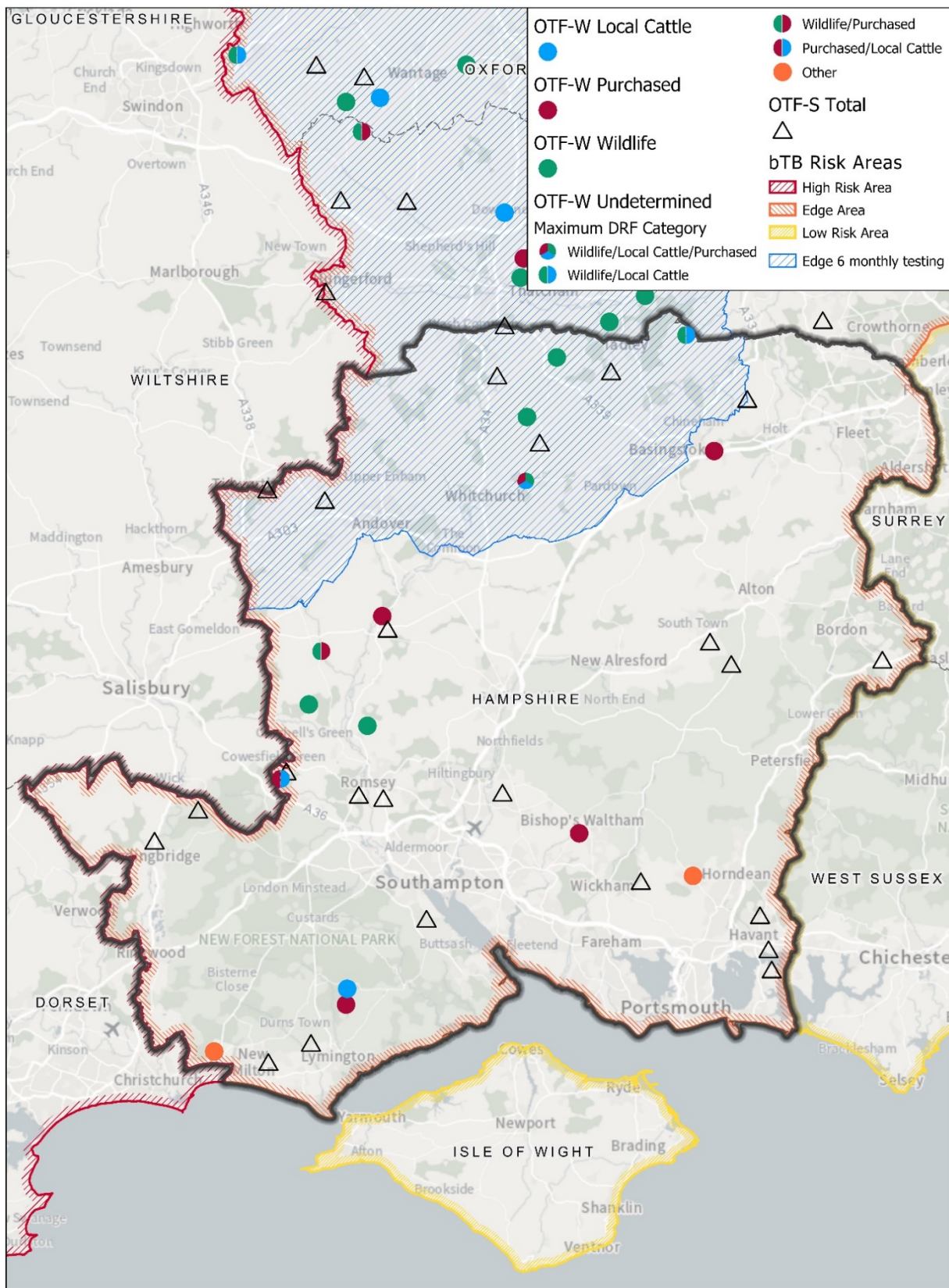
The score is recorded as either definite (score 8), most likely (score 6), likely (score 4) or possible (score 1). Risk pathway data are explored both at the herd and county level.

The most likely source of infection in individual TB incidents

The most likely source identified by the APHA veterinary assessment is explored spatially for individual TB incidents. The most likely source of infection for individual TB incidents discounts additional risk pathways identified with a lower level of certainty.

Where two sources were ranked equally as the most likely source for an incident, both sources are reported for the incident using a split symbol in the map.

The four new TB incidents in Hampshire in 2020 where infected wildlife was considered the source of infection with the highest level of certainty were all in the north or west of the county (Figure 13). This is to be expected in the north as they were in the *M. bovis* genotype 10:a homerange area.



Creator: GIS Team
 Source: Sam
 OTFW data as at 15th of April 2021
 Ref: 20210604
 Date: 04/06/2021

DRF Source - Hampshire

0 4 8 16 Kilometers
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 Ordnance Survey 100051110

However, the two in the west of the county which were confirmed with genotype 11:a were not in an area within a homerange. The Disease Report Forms (DRFs) from on-farm epidemiological assessments indicated that one of the three genotype 11:a incidents could be traced back to a cattle movement but the other two had no conclusive cattle movement links but were located close to the first incident.

Four TB incidents in the annual testing portion of the county had strong epidemiological links to farms or locations where their *M. bovis* genotype has previously been disclosed. Two incidents were linked to cattle purchases from the HRA and two to movement of cattle within Hampshire.

The weighted source of infection at county level

To consider the contribution of all sources of infection within an area, the source(s) for each incident are weighted by the certainty ascribed. Any combination of definite, most likely, likely, or possible sources can contribute towards the overall picture for possible routes of introduction in to a herd.

If the overall score for a herd is less than six, then the score is made up to six using the 'Other/Unknown Source' option. Buffering up to six in this way helps to reflect the uncertainty in assessments where only 'likely' or 'possible' sources are identified.

The weight of infection outputs in Appendix 4 are produced by combining the data from multiple herds. This presents the overall proportion of pathways in which each source was identified, weighted by the level of certainty each source caused the introduction of TB. The outputs do not show the proportion of herds where each pathway was identified (this is skewed by the certainty calculation).

Genotyping of *M. bovis* isolates can be a powerful tool in identifying a likely source of infection, however genotypes are not determined for OTF-S herds. The inclusion of OTF-S herds in these calculations increases the uncertainty in the outputs. As a result, the relative proportions of each risk pathway is very approximate and only broad generalisations should be made from these data. A more detailed description of this methodology is provided in the [Explanatory Supplement](#).

Movement of undetected infected cattle and direct or indirect contact with local infected badgers were the two key sources of infection accounting for over half of the weighted source pathways attributed for all new TB incidents in Hampshire in 2020 (Figure 14a and Figure 14b).

The weighted source pathways of infection for all new incidents in 2020 is described in Appendix 4. In OTF-W incidents 66% of pathways were attributed to cattle movement and wildlife combined (Figure 14a). This is very similar to the percentages found in 2019.

The weighted pathways for OTF-S incidents (Figure 14b) were markedly different, partially explained by the absence of genotype information to assist in researching sources of infection.

Other or unknown source accounted for 28% of incidents and residual 24%. Infected badgers and other wildlife sources only accounted for 8% of OTF-S incidents, reflecting the fact that most of them occurred in the areas of the county where *M. bovis* reservoirs are not thought to exist in wildlife.

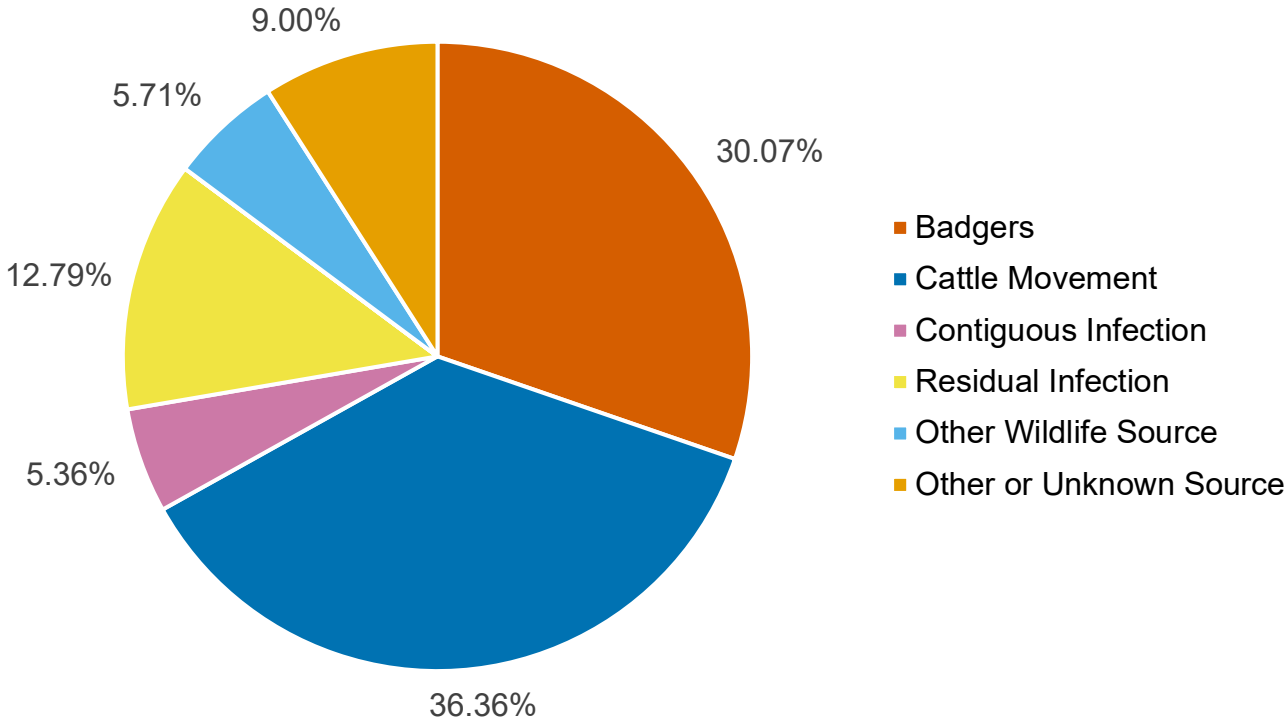


Figure 14a: Summary of the weighted source of infection pathways attributed for OTF-W TB incidents that started in 2020 in Hampshire, that had a completed DRF (n=14).

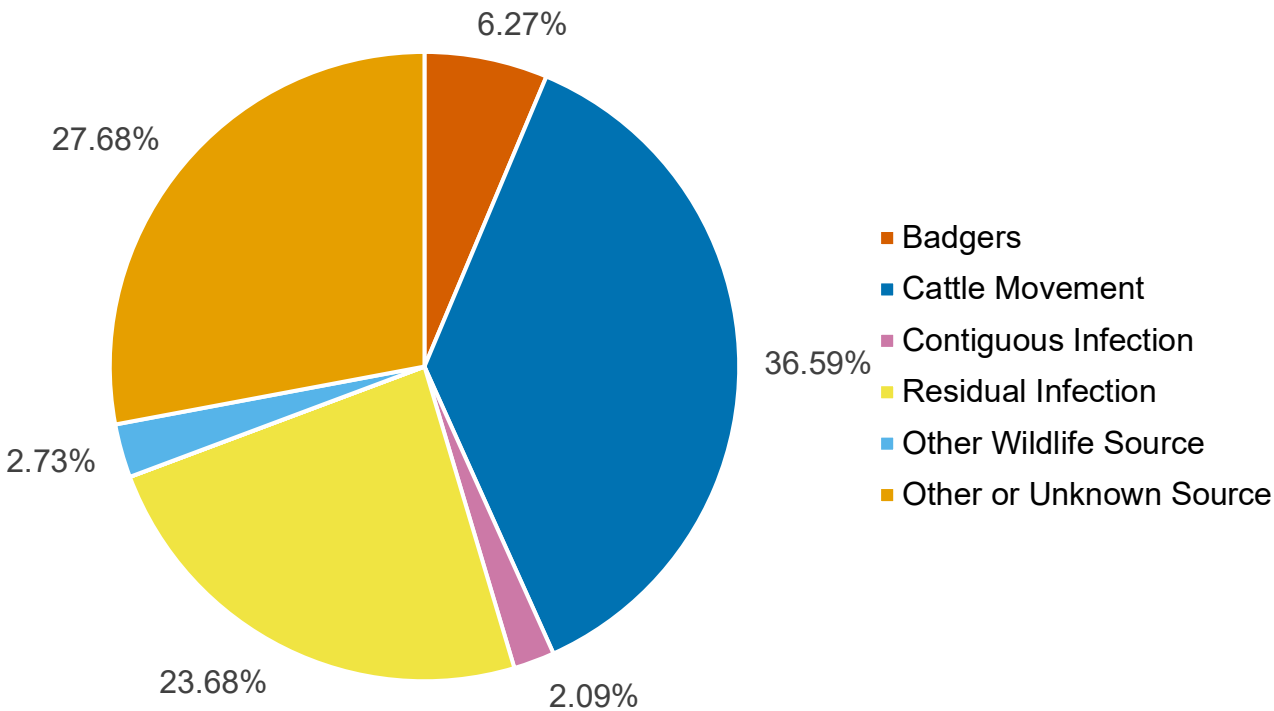


Figure 14b: Summary of the weighted source of infection pathways attributed for OTF-S TB incidents that started in 2020 in Hampshire, that had a completed DRF (n=22).

TB in other species

There is no statutory routine TB surveillance of live non-bovine species. Post-mortem examination (PME) is performed on suspected clinical cases reported to APHA. Furthermore, post-mortem meat inspection is carried out on all captive animals (for example, sheep, goats, pigs or deer) slaughtered for human consumption.

There was a single incident of laboratory-confirmed infection of *M bovis* in Hampshire in 2020 in a cat. It occurred in a domestic dwelling in the south of Hampshire. Whole genome sequence analysis indicated that this isolate of *M. bovis* was closely related to a series of GB-wide incidents of TB in cats related to the feeding of raw petfood.

Detection of TB incidents

Figure 15 illustrates the various methods by which TB incidents were first detected in Hampshire in 2020. As expected, routine whole herd testing (WHT) contributed the highest percentage.

Pre-movement testing (PRMT), radial testing (RAD) and six month post-incident testing (6M) also played a part in detecting infection at an earlier stage. Unusually, detection of TB incidents at the slaughterhouse did not feature in 2020.

It is significant that RAD testing disclosed five OTF-W incidents in 2020, indicating early detection of disease but also possible indication of wildlife involvement in local spread of infection between cattle herds.

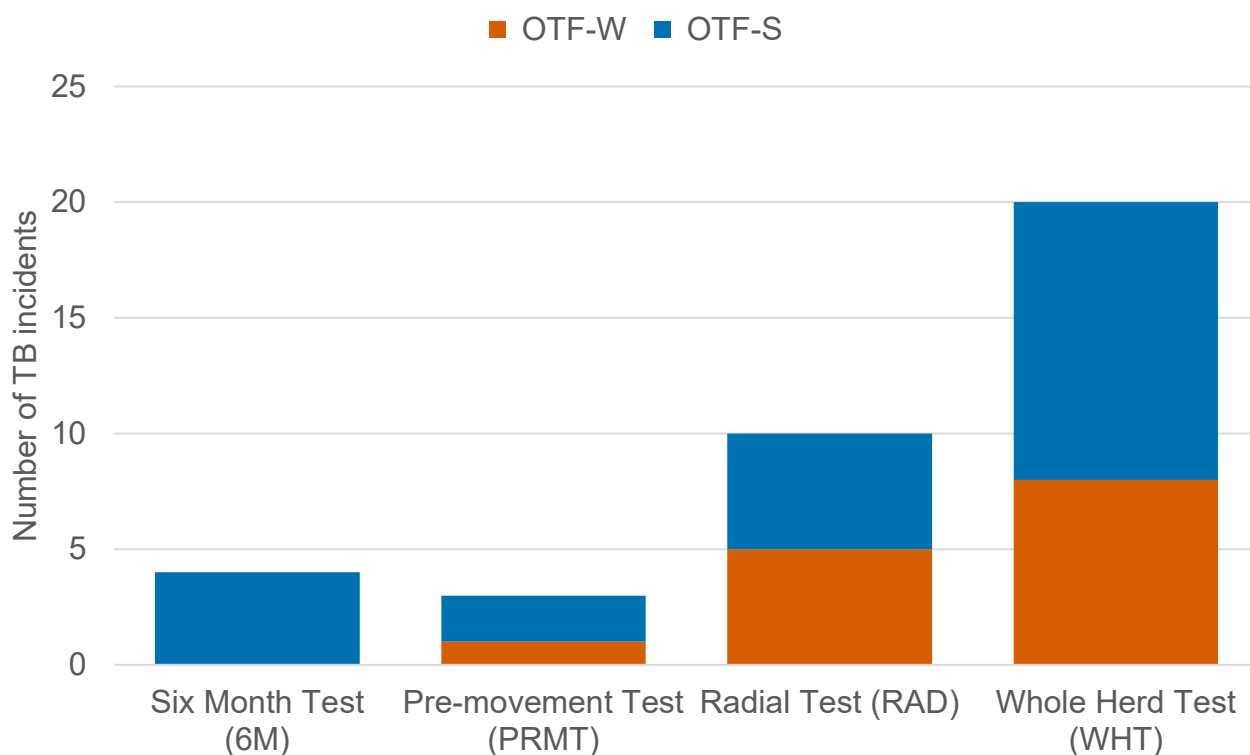


Figure 15: Number of TB incidents (OTF-W and OTF-S) in Hampshire in 2020, disclosed by different surveillance methods.

It is of interest that only four out of the 14 OTF-W herds had suffered a TB incident in the past three years (Figure 16).

Figure 16 shows the number of new OTF-W and OTF-S incidents in 2020, that had experienced an OTF-W incident in the previous three years. It excludes new incidents that were also on restrictions in the first four or more months of 2020 due to an incident that started before 2020.

The [Explanatory Supplement](#) (see section 4.3) provides more details on the reporting of recurrent TB incidents.

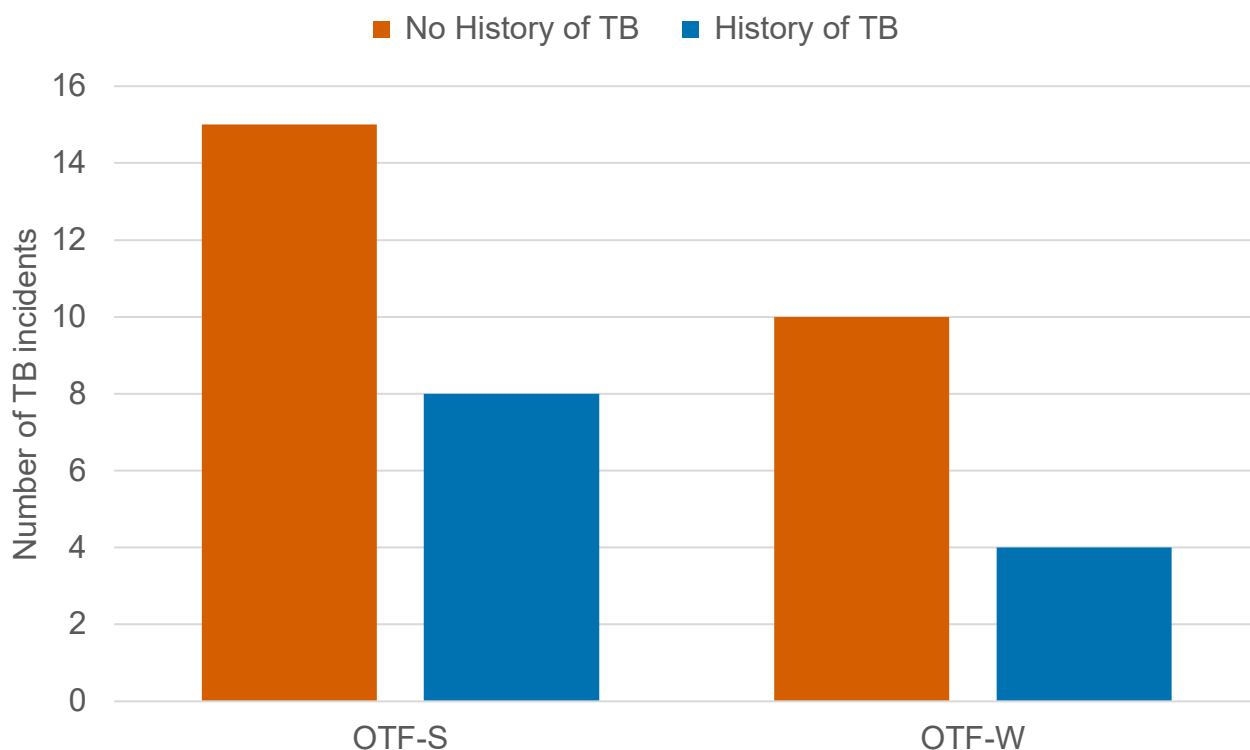


Figure 16: Number of herds with a TB incident (OTF-W and OTF-S) in Hampshire in 2020, with a history of TB (herds that experienced an OTF-W incident in the previous three years), and holdings without a history of TB in the previous three years.

Skin test reactors and interferon gamma test positive animals removed

There were 276 cattle compulsorily slaughtered due to TB control in Hampshire in 2020 (Figure 17). This was higher than 2019 and similar to levels seen in 2015, 2016 and 2018.

In 2020, 146 cattle were skin test reactors and 130 were detected by IFN- γ testing. The average number of reactors identified and removed per incident was higher in 2020 at 7.5 compared to 4.9 in 2019.

These figures are disappointing after the decrease in numbers of reactors per incident in 2019 and meant that farmers were having to replace more animals and there was an increase in total compensation paid for removal of cattle.

The average number of skin test reactors per incident has been more stable ranging from 2.8 (2015) to 4.2 (2018). In 2020 this was 3.9 and in 2019 it was 3.2 which indicates that most of the variability was caused by the IFN- γ test-positive component.

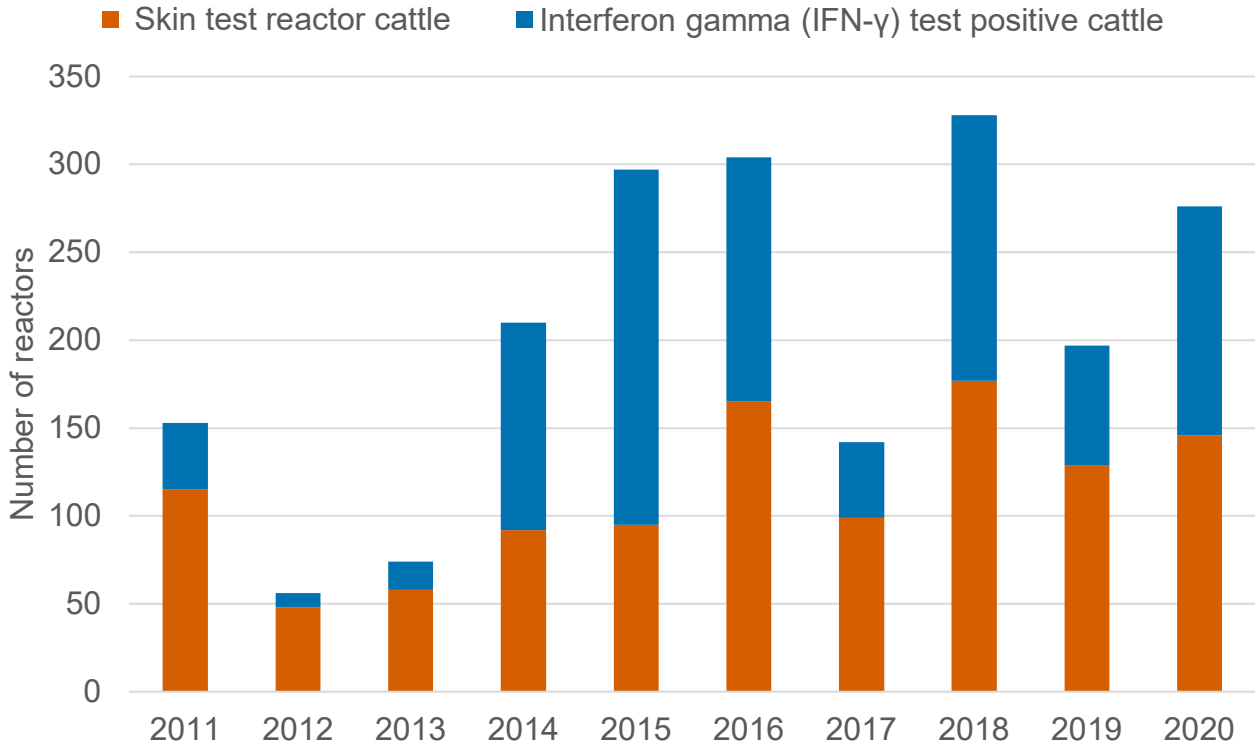


Figure 17: Number of skin test reactors and interferon gamma (IFN- γ) test positive cattle removed by APHA for TB control reasons in Hampshire, 2011 to 2020.

Summary of risks to Hampshire

Purchase of undetected infected cattle from the HRA continued to pose the greatest threat of introduction of infection to Hampshire, including different *M. bovis* genotypes from those already endemic in the county.

This is illustrated by the two TB incidents where genotype 9:d was disclosed and linked to purchase of cattle from Wiltshire through a market in the HRA.

Potential movement of infection in wildlife populations across the county border from the HRA counties of Wiltshire and Dorset has been a threat for many years. However, the epidemiological picture from cattle infections suggests that this may only have happened in the north-western border of Hampshire with Wiltshire.

In the south of the county the river Avon may be acting as a physical barrier to wildlife spread. This may help attempts to keep infection from entering the New Forest.

The area of suspected reservoir of infection in wildlife does not appear to have spread further eastwards, but there are concerns that new separate reservoirs of infection may be becoming established to the south and east of the current endemic area.

One area of concern to the west of Winchester and affected by genotype 10:u in 2019 has not developed further in 2020. Another area of concern consisting of a trio of incidents with genotype 11:a were disclosed in the Test Valley, two of which had no conclusive source such as purchase of undetected infected cattle.

There is a risk of spread within the county where a number of dairy herds use ex-dairy farms to rear their heifers, and these may be at some distance from the home premises. As in 2019, there were incidents in 2020 where the most likely source of infection was from heifers reared in the north of the county.

Summary of risks from Hampshire to surrounding areas

The LRA county of Surrey is separated from the reservoir of infection in wildlife in Hampshire by low cattle densities either side of the border and by conurbations such as Aldershot, Farnham, and Farnborough. The low cattle density means that there are fewer cattle to act as sentinels to detect potential spread of infection in wildlife.

The LRA county of West Sussex has an area of dense cattle population close to the county boundary with Hampshire, but currently the reservoir of infection in wildlife is still a considerable distance away to the east. There are no specific natural or man-made barriers to wildlife movement towards West Sussex and spread of the infection front over the coming years.

There is little trade in cattle from Hampshire to the Isle of Wight (LRA) because of the absence of any markets in Hampshire. Purchasers on the Isle of Wight are more likely to have bought stock from markets in the HRA. The lack of a market in Hampshire may therefore increase the likelihood of undetected infected animals reaching the island by focusing sourcing of cattle towards the HRA rather than the nearest county.

Assessment of effectiveness of controls and forward look

Effectiveness of controls

Herd incidence in Hampshire in 2020 dropped marginally and was lower than that recorded for 2019 and 2018.

Forward look

A substantial proportion of Hampshire will have a crude OTF-W incidence of less than 2% because TB infection is regionalised within the county. However, unless control measures in wildlife are used alongside surveillance and control measures in cattle, the overall county incidence is unlikely to fall below these targets.

Appendices

Appendix 1: Overview of risk and surveillance areas of England and Edge Area objectives and controls

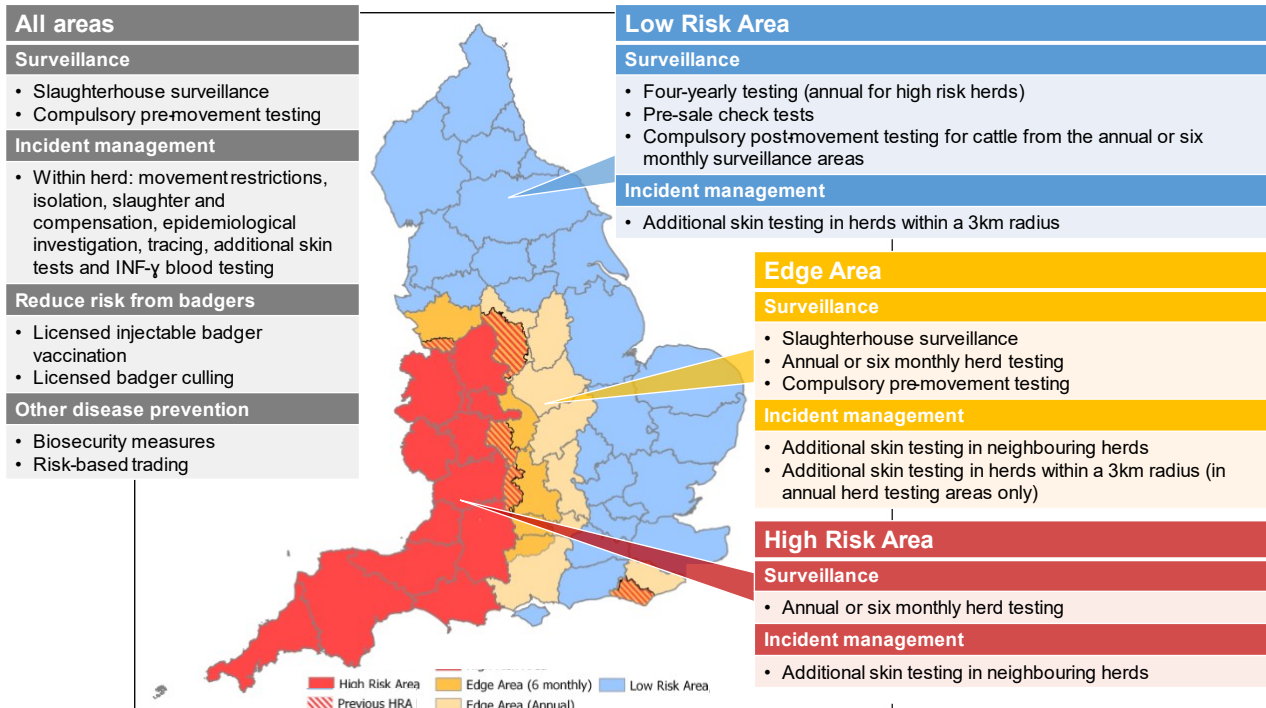


Figure A1: TB risk and surveillance areas of England effective since January 2018, as set out in the Government’s Strategy for Achieving Officially Tuberculosis-Free Status for England. The map is described in more detail in the [Explanatory Supplement for England 2020](#).

Short to medium term:

- slow down geographic spread of endemic infection
- maintain crude herd incidence of OTF-W incidents less than 2% overall by 2019
- begin to reduce the incidence rate

Longer term:

- reduce geographic spread of TB and push the Edge Area boundaries westward
- reduce OTF-W herd incidence to less than 1% by 2025
- attain OTF status (crude incidence of indigenous OTF-W herd incidents less than 0.1%) for the lowest incidence counties in the Edge Area

For more information about the governments approach to controlling TB, visit the strategy for achieving Officially Bovine Tuberculosis Free status for England, published in 2014 and independently reviewed in 2018, see:

- [A strategy for achieving officially bovine tuberculosis free status for England](#)
- [Government sets out next phase of strategy to combat bovine tuberculosis](#)

Key Control Measures

Surveillance:

- six monthly or annual routine whole herd testing
- additional targeted surveillance of cattle herds located within a 3km radius of new OTF-W incidents in annual testing sections of the Edge Area (radial testing)
- slaughterhouse (SLH) surveillance

Management of cases ('incidents'):

- increased sensitivity of incident herd testing:
- all incident herds must pass two consecutive short interval skin tests at severe interpretation to regain OTF status, irrespective of PM and bacteriological findings
- mandatory IFN- γ parallel testing of herds with OTF-W incidents
- enhanced management of herds with persistent incidents
- enhanced epidemiological investigation and data analysis
- information sharing - location of incident herds publicly available (using [ibTB](#) online interactive mapping tool)
- restriction for life of all inconclusive reactors (IRs) that give a negative result on a re-test was introduced in November 2017 ('resolved IRs' policy). The only permitted movements of these animals are to slaughter or an Approved Finishing Unit, or after being subjected to a private IFN- γ test with negative results

TB controls in the wildlife reservoir (badgers):

- licensed badger culling in high incidence sections of the Edge Area
- Government grants for licensed voluntary badger vaccination projects using injectable badger BCG (Badger Edge Vaccination Scheme (BEVS))

Other measures:

- compulsory pre-movement skin testing of cattle moved between herds
- promotion of herd biosecurity measures to reduce the risk of new incidents

Summary of enhanced TB control measures in Hampshire

Edge Area testing policy

- Ten TB incidents in Hampshire in 2020 generated 3km radial testing zones. Ten incidents were disclosed at the resulting radial tests, five OTF-W and five OTF-S. This shows the value of radial testing to find infection at an early stage.
- One persistently infected herd resolved in 2020 without the need for supplementary IFN- γ testing. Slaughter of IRs and direct contacts (DCs) occurred following veterinary assessment on a case by case basis for persistently infected herds.

Other testing measures

- Despite COVID-19 public health restrictions, the number of overdue TB tests was minimal because of actions taken by APHA with the assistance of Hampshire Trading Standards. Overdue testing therefore posed minimal risk to the county.
- There were no laboratory-confirmed cases of *M. bovis* in wild deer in Hampshire in 2020.

Other control measures

- The [TB advisory Service \(TBAS\)](#) continued to provide bespoke biosecurity advice to farmers though with a reduction of farm visits due to Covid-19 public health restrictions.
- Quality assurance audits of TB testing by official veterinarians was reduced due to the COVID-19 pandemic.
- No regional TB meetings were held with farmers and their representatives in Hampshire in 2020 due to the COVID-19 pandemic.
- APHA worked with Local Authorities regarding enforcement action for both overdue TB testing and illegal cattle movements from herds under TB movement restrictions.

Appendix 2: Cattle industry in Hampshire

Table A2.1: Number of cattle premises by size band in Hampshire at 1 January 2020. (RADAR data)

Size of herds	Un*	1-50	51-100	101-200	201-350	351-500	501+	Total number of herds	Mean herd size	Median herd size
Number of herds	10	430	107	85	44	13	24	713	84	32

*The number of herds with an undetermined size.

Table A2.2: Number of animals by breed purpose in Hampshire at 1 January 2020.

Breed purpose	Beef	Dairy	Dual purpose	Unknown	Total
Number of cattle	35,477 (59%)	21,017 (35%)	3,272 (5%)	0	59,766

Appendix 3: Summary of headline cattle TB statistics

Table A3.1: Herd-level summary statistics for TB in cattle in Hampshire between 2018 and 2020.

Herd-level statistics	2018	2019	2020
(a) Total number of cattle herds live on Sam at the end of the reporting period	880	906	886
(b) Total number of whole herd skin tests carried out at any time in the period	952	964	959
(c) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	748	712	694
(d) Total number of OTF cattle herds at the end of the report period (herds not under any type of Notice Prohibiting the Movement of Bovine Animals (TB02) restrictions)	841	857	834
(e) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	858	884	859
(f) Total number of new TB incidents detected in cattle herds during the report period, (including all FUs)	42	40	37
• OTF-S	29	22	23
• OTF-W	13	18	14
(g) Of the OTF-W herd incidents:			
• How many can be considered the result of movement, purchase or contact from or with an existing incident based on current evidence?	6	4	1

Herd-level statistics	2018	2019	2020
<ul style="list-style-type: none"> New OTF-W incidents triggered by skin test Reactors or 2xIRs at routine herd tests 	7	9	8
<ul style="list-style-type: none"> New OTF-W incidents triggered by skin test Reactors or 2xIRs at other TB test types (such as, forward and back-tracings, contiguous, check tests) 	2	7	6
<ul style="list-style-type: none"> New OTF-W incidents first detected through routine slaughterhouse TB surveillance 	0	1	0
(h) Number of new incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds			
<ul style="list-style-type: none"> OTF-S 	5	2	1
<ul style="list-style-type: none"> OTF-W 	5	2	0
(i) Number of OTF-W herds still open at the end of the period (including any ongoing OTF-W incidents that began in a previous reporting period, but not including non-grazing Approved Finishing Units)	8	11	12
(j) New confirmed (positive <i>M. bovis</i> culture) incidents in non-bovine species detected during the report period (indicate host species involved)	0	1 Fallow Deer	1 Cat
(k) Number and type of finishing units active at end of the period:			
<ul style="list-style-type: none"> Approved Finishing Units: Grazing 	0	0	0
<ul style="list-style-type: none"> Approved Finishing Units: Non Grazing 	0	0	0
<ul style="list-style-type: none"> Exempt Finishing Units: Grazing 	0	0	0
<ul style="list-style-type: none"> Exempt Finishing Units: Non Grazing 	2	2	1

Table A3.2: Animal-level summary statistics for TB in cattle in Hampshire between 2018 and 2020.

Animal-level statistics (cattle)	2018	2019	2020
(a) Total number of cattle tested in the period (animal tests)	111,509	111,086	111,208
(b) Reactors detected in tests during the year:			
• Tuberculin skin test	177	129	146
• Additional IFN- γ blood test reactors (skin-test negative or IR animals)	151	68	130
(c) Reactors detected during year per incidents disclosed during year	7.8	4.9	7.5
(d) Reactors per 1000 animal tests	2.9	1.8	2.5
(e) Additional animals slaughtered during the year for TB control reasons:			
• DCs, including any first-time IRs	18	18	7
• Private slaughters	3	15	6
(f) SLH cases (tuberculous carcasses) reported by Food Standards Agency (FSA)	3	7	3
(g) SLH cases confirmed by culture of <i>M. bovis</i>	0	3	0

Note: (c) Reactors detected during year per incidents disclosed during year, reactors may be from incidents disclosed in earlier years, as any found through testing during the report year count here.

Note: (g) SLH cases confirmed by culture of *M. bovis*, not all cases reported are submitted for culture analysis. All cases reported are from any period prior to or during restrictions.

Appendix 4: Suspected sources of *M. bovis* infection for all the new OTF-W and OTF-S incidents identified in the report period

Table A4: Suspected sources of *M. bovis* infection for all the new OTF-W and OTF-S incidents identified in Hampshire, in 2020.

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	14	0	5	0	15.8%
Cattle movements	17	8	8	0	36.7%
Contiguous	3	0	1	0	3.4%
Residual infection	5	7	4	0	19.6%
Domestic animals	0	0	0	0	0.0%
Non-specific reactor	0	0	0	0	0.0%
Fomites	0	0	0	0	0.0%
Other wildlife	8	1	0	0	4.0%
Other or unknown source	1	1	5	0	20.5%

Please note that each TB incident could have up to three potential pathways so totals may not equate to the number of actual incidents that have occurred. Details of the methodology used to calculate the weighted contribution of the different suspected sources of *M. bovis* infection for all new incidents can be found in the main body of the report and in the [Explanatory Supplement](#).



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